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USSR: Consequences of Delays in Freight Car Modernization Program

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A Research Paper

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SOV 85-10115
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This paper was prepared by the Office of Soviet Analysis.

Comments and queries are welcome and may be directed to the Chief, Economic Performance Division, SOVA

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USSR: Consequences of Delays in Freight Car Modernization Program 25X1

Summary

Information available as of 31 May 1985 was used in this report.

The railroad system has been a target of concern and criticism at the highest levels of the Kremlin since the late 1970s. The USSR's railroads carry nearly half of all freight traffic, including almost 80 percent of industrial materials traffic. Freight car shortages and congestion on a growing list of key mainlines have been blamed repeatedly for underfulfillment of production targets in other sectors of the economy. 25X1

The Soviets were aware by the late 1960s that railway congestion would loom as a major problem for the economy within a decade, and they had planned to counter it not by building more trunklines but by modernizing the railways to improve their carrying capacity. Upgrading the freight car fleet was a crucial part of the plan. Higher capacity freight cars—which would make up fewer but heavier trains—would carry much larger volumes of cargo. Also, Moscow wanted to field a larger proportion of special-purpose cars—which would better match the cargoes of key sectors such as agriculture. These cars were intended to reduce cargo losses, reduce the proportion of "below-capacity" loads, and improve freight car availability by expediting loading and unloading. 25X1

Implementation of this ambitious program to upgrade the fleet, however, dragged on well past the original timetable. In particular, it had not progressed enough to counter increasing railway congestion, which began to undermine performance in the late 1970s. Indeed, had other factors not combined to slow the growth of industry and agriculture, railway congestion would have been more severe. 25X1

In response to poor railway performance in the late 1970s, the Soviets accelerated the preparation of facilities for the future production of new car models, but, because of a sharp reduction in output of older models, total output fell. Because many freight car plants produce armored vehicles, it is possible that competing defense needs could have contributed to the decline. 25X1

Although the decline in production of freight cars at the same time as a decline in imports and a rise in retirements reduced growth of the freight car inventory, we believe that growth in the inventory of older model cars was ample to meet the correspondingly slow growth of demand for rail transport services. We attribute the crippling shortages of cars during the late 1970s instead to the fleet's declining productivity. This decline was

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caused by increasing congestion on the rail lines, aging of the fleet, and perhaps an inadequate supply of skilled labor, which resulted in reduced train speeds and increased time for loading and unloading operations. For example, although the number of freight cars in the Soviet Union grew between 1975 and 1980, a dramatic increase in the duration of an average freight car trip limited the growth in the annual carrying capacity of the fleet. Remedial measures to curb this trend toward longer turnaround times in the early 1980s led to a higher incidence of freight car damage, and shortages persisted.

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After a very poor performance of the railroads in 1982, the Politburo under Andropov's leadership acted to reverse these trends. Three new policies were adopted that probably were major contributors to markedly improved performance in 1983: loading of freight cars above state standards, which increased train weights and thus reduced congestion; lessening the average duration of a freight car trip—probably by decreasing loading and unloading times by hiring workers to continue operations at nights and on weekends and holidays; and increasing the base for repairs of freight cars by boosting the participation of industrial enterprises. Even though they worked in 1983, we view these as essentially stopgap measures and not as substitutes for the modernization plan itself.

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The program to upgrade the fleet has begun, albeit belatedly, and we expect continuous although slow improvement in rail performance through 1990. Production of newly designed freight cars has already increased at some plants and will begin soon at others. Imports of new models from Eastern Europe and Finland also will boost inventories.

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Although we expect demand for rail freight service to grow slowly over the same period, problems with congestion will continue. As a result, we believe there will be pressures to increase production of new models of freight cars faster than the growth in demand would seem to warrant. The Soviets appear particularly determined to increase the inventory share of special-purpose cars, particularly those for agricultural products. Also, pressure will increase to retire older, less efficient models of the general purpose fleet—boxcars and gondolas—and to replace them with new models. We also expect increased production of higher capacity, six- and eight-axle gondolas. All of these new production initiatives will aid in curing congestion on the mainlines through an increase in the average carrying capacity per car.

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Although we expect the modernization plan to improve rail performance, replacement of a substantial part of the huge freight car fleet—even if given a top priority—will take time. As a consequence, the Soviets will have to continue to combat congestion and freight car shortages on the mainlines. Moreover, until there is substantial excess capacity in the rail system, the railroads will remain vulnerable to the effects of severe winter weather—as the system's performance during the 1984/85 winter demonstrated. Therefore, probably at least until 1990, the Kremlin will have to continue to rely on stopgap measures, like those introduced in recent years, to stabilize rail performance during the transition.

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Contents

		Page
Summary		iii
Introduction		1
Background		1
Freight Car Modernization		2
	The Scope of the Program	2
	Targets Missed—Plans Redrawn	5
	Production Takes a Nosedive	7
	Production Outlook	8
Inventory Growth Decelerates		8
	Retirements	8
	Trade	9
	Changing Composition of the Freight Car Inventory	10
	Outlook for the Inventory	10
Delayed Modernization—The Effects on Railroad Performance		11
	Rising Turnaround Times Lead to Freight Car Shortages	11
	Rising Freight Car Damage Causes Further Problems	14
	Growing Congestion—A Continuing Concern	14
	Stopgap Measures To Stabilize Rail Performance	14
Outlook		16

Appendix

Methodology for Determining Railcar Production at Abakan		21

Tables

1.	USSR: Freight Turnover by Major Carrier	2
2.	USSR: Freight Car Production	5
3.	USSR: Trends in Freight Car Production by Republic	7
4.	USSR: Estimates of the Freight Car Inventory	9
5.	USSR: Estimated Imports of Freight Cars	10
6.	USSR: Changing Composition of the Freight Car Fleet	12
7.	USSR: Trends in Economic Activity and Growth of Transportation	12
8.	USSR: Main Indicators of Rail Performance	13
9.	USSR: Availability of the Freight Car Fleet, 1981	14
10.	USSR: Estimated Freight Car Use by Commodity, 1981	17

Sanitized Copy Approved for Release 2011/02/28 : CIA-RDP86T00591R000200300002-8

Sanitized Copy Approved for Release 2011/02/28 : CIA-RDP86T00591R000200300002-8

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USSR: Consequences of Delays in Freight Car Modernization Program

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Introduction

The USSR depends much more heavily on rail transportation than do most developed countries; its railways provide almost half of all transport services (see table 1). Until the mid 1970s, the USSR had successfully squeezed more out of its rail transport system each year with minimum investment. For example, between 1970 and 1975, the inventory of rolling stock, rail lines, and support facilities grew by roughly 4 percent per year. Rail freight turnover (ton-kilometers), in contrast, grew faster: more than 6½ percent annually. Moscow invested in upgrading, rather than expanding, the system. The replacement of steam locomotives with more powerful diesel-electric and electric locomotives, for example, supported greater volumes of traffic on existing main-lines.[1] Traffic densities—ton-kilometers hauled per kilometer of track—rose far above freight densities elsewhere in the world.

Soviet planners recognized, probably by the late 1960s, that benefits from the locomotive revolution were coming to a close and that further increases in traffic densities were becoming more difficult to achieve. With the rail lines approaching saturation, the USSR has emphasized the strategy of raising the average weight carried per freight car by developing (a) standard cars designed to carry higher weights and (b) specialized cars designed to better match cars and cargoes. But there have been major delays in carrying out this modernization program. This paper examines the program's central elements and the effect on the size and composition of the freight car inventory that failure to achieve these goals on schedule has had. It also describes difficulties resulting from both these delays and inadequate management of freight car use, as well as the adjustments the Soviets have made to redress these problems. Finally, the paper examines current policies to increase and improve the effectiveness of the freight car fleet, and it evaluates the adequacy of these measures for meeting the expected demand for freight service.

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Background

Moscow had three broad options for avoiding the congestion of the rail lines projected for the late 1970s:

- Move traffic to other carriers.
- Construct new rail lines—including new tracks paralleling heavily used segments.
- Increase—yet again—the capacity of existing lines.

The only major breakthrough for alternative carriers was expansion of oil, and then gas, pipelines. As a result, growth in transport of most industrial materials depended on the railways.

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Probably because of the very high cost in the near term, the Soviets decided against a major expansion of rail lines in the industrial heartland, favoring instead the third option, increased utilization of existing lines. To increase densities the Soviets could:

- Increase the capacity of the lines—the number of trains which can travel between two points in a day—by increasing train speeds or reducing the intervals between trains.
- Reduce inefficient use of existing capacity by eliminating not only poorly planned, empty, and cross hauls but also undercapacity runs caused by inappropriate matches of cars and cargoes.
- Increase the cargo weight of trains.

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Train speeds and intervals between trains were already pressing the system's limits. Inefficient hauls—resulting from poor matches of producers and consumers—make up perhaps 7 percent of all traffic, and

[1] Steam locomotives require much more frequent stops for refueling and maintenance than do diesel-electric and electric locomotives.

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Table 1
USSR: Freight Turnover By Major Carrier [a]

	1965	1970	1975	1980	1981	1982	1983	1984
Total *(Trillion ton-kilometers)* [b]	**2.8**	**4.0**	**5.5**	**6.8**	**7.0**	**7.1**	**7.5**	**7.7**
Rail	1.9	2.5	3.2	3.4	3.5	3.5	3.6	3.6
Maritime	0.4	0.7	0.7	0.8	0.9	0.8	0.9	0.9
Pipelines	0.2	0.4	0.9	1.8	1.9	2.1	2.2	2.4
Highway	0.1	0.2	0.3	0.4	0.5	0.5	0.5	0.5
River	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Air	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL
Total *(Shares in percent)* [b]	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Rail	69	63	59	51	50	49	48	47
Maritime	14	17	13	13	12	12	12	12
Pipelines	7	10	17	27	28	29	29	31
Highway	5	6	6	6	7	7	6	6
River	5	4	4	4	4	4	4	3
Air	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL	NEGL

[a] All data are taken from various issues of *Narodnoye khozyaystvo SSSR* (hereafter referred to as *Narkhoz*) unless otherwise noted.
[b] Components may not add to totals due to rounding.

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their elimination would not offer large sustainable gains. The Soviets apparently viewed the running of trains below their weight capacity—caused by inappropriate matches of cars and cargoes—as a more serious problem, which could be solved with more specialized freight cars. They also believed that increasing the weight trains could carry beyond current norms would result in a large increase in the density of freight movement on the rail system.

The Soviets selected a two-pronged approach to increase train weight. First, longer trains would be run. Doing so required a major program to lengthen sidings as well as station track, to develop an improved approach for locomotion, and to increase the durability and strength of mainline rail. Second, the carrying capacity of each freight car in existing trains would be increased. To use higher capacity freight cars while limiting wear and tear on existing track, the Soviets produced six- and eight-axle freight cars designed to spread extra weight over more axles (see figure 1). The eight-axle car, for example, provided more than 80-percent greater carrying capacity for only a 60-percent increase in length and a 50-percent increase in the load per meter of track.

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The development of more specialized and higher capacity freight cars and—as a corollary—more powerful locomotives was therefore an integral part of the Soviets' overall program to increase the carrying capacity of their mainlines and thus avert rail bottlenecks.

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Freight Car Modernization

The Scope of the Program

In the late 1960s, Moscow formulated ambitious plans to boost railcar production and upgrade the fleet—annual railcar output was planned to jump from about 58,000 cars in 1970 to 95,000 in 1975. Most of the expansion through 1975—the addition of

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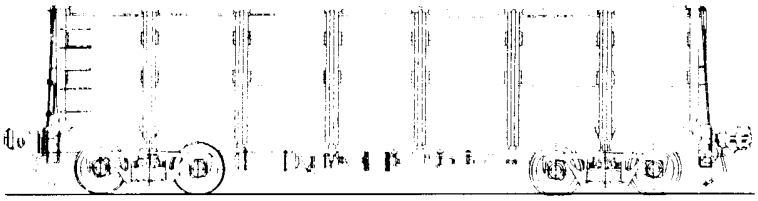
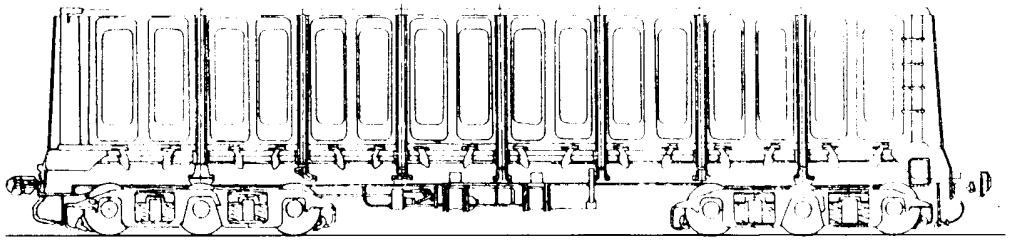
Figure 1
USSR: Four-Axle, Six-Axle, and Eight-Axle Gondola Cars

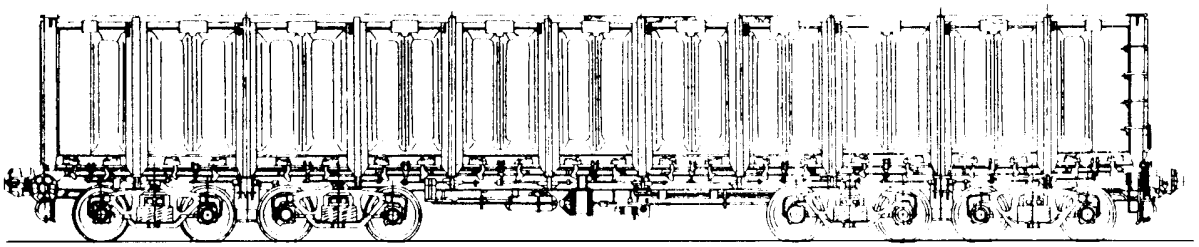
Four-Axle Gondola Car



Six-Axle Gondola Car



Eight-Axle Gondola Car



Characteristics	Four-Axle	Six-Axle	Eight-Axle
Car length (meters)	12.7	16.4	20.2
Carrying capacity (metric tons)	69.0	94.0	125.0
Body volume (cubic meters)	73.0	104.0	137.5
Design load (metric tons per meter of track)			
From axle to rails	22.0	22.0	22.0
Per running meter of track	5.4	7.6	8.3

Note: Drawings are to scale in length only.

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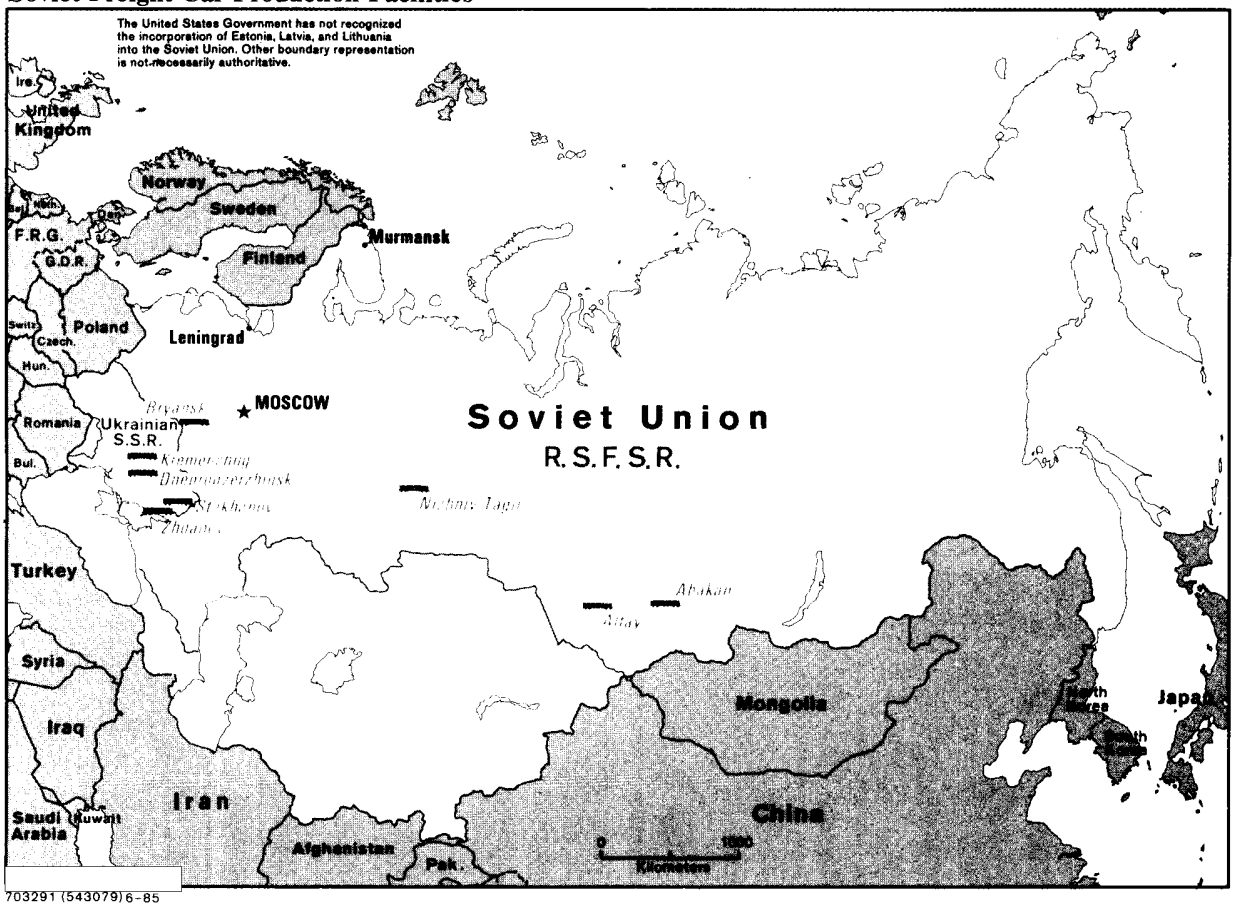
Figure 2
Soviet Freight Car Production Facilities



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capacity for some 37,000 cars per year—probably was to be concentrated in plants in the Ukraine, the hub for special-use cars such as tank cars and grain hoppers (see figure 2). The Soviets planned to produce newly developed eight-axle cars at the Zhdanov, Stakhanov (also known as Kadiyevka), and Nizhniy Tagil plants, probably by 1973. The freight car plant at Dneprodzerzhinsk reportedly was to begin series production of container-carrying flatcars in 1974.

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During the 1976-80 period, a further expansion of capacity was slated to support annual production rates of 140,000 to 150,000 freight cars (probably expressed in four-axle equivalents) by 1978.[2] Much of the planned increase in capacity probably was geared to the production of container carriers, higher capacity six- and eight-axle freight cars, and other specialized cars.

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[2] The Soviets normally reported freight car production in numbers of cars—regardless of carrying capacity. Little ambiguity existed because almost all (99 percent) of Soviet freight car production consisted of cars with four axles. However, we believe this plan data, and that for the Abakan freight car plant later, reflected the conversion of the number of larger six-axle and eight-axle cars the Soviets expected to produce to an equivalent number of four-axle cars with the same carrying capacity.

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[redacted] most of the post-1975 planned addition of capacity—50,000 cars annually—primarily in West Siberia. Most of the increase was linked to the completion of the huge Abakan Freight Car Plant—scheduled to start producing freight cars in 1976 and have a capacity of 40,000 cars a year.[3] In addition, the Soviets planned to complete in 1976 a 5-bay expansion of the Altay railcar plant—also in West Siberia. This plant, the largest boxcar producer in the USSR, was to be the leading producer of an upgraded all-metal boxcar. [redacted]

Targets Missed—Plans Redrawn

The pattern of actual railcar production presented in table 2 contrasts sharply with the original plans. By 1975, production was less than 75 percent of the target, and by 1978 this ratio fell to less than half. The seeds of the shortfall were planted in 1972 and 1973 when freight car producers—after maintaining high growth in the 1966-70 period and overfulfilling their 1971 plan—began to fall behind current production targets. In addition, construction of new capacity—intended to boost production in the future—slipped well behind schedule. [redacted]

[redacted] plants under the Ministry of Heavy and Transport Machine Building fell short by 3,200 freight cars in planned deliveries to the railroads in 1972. Three leading plants in the Ukraine—where production growth was to be most rapid—were blamed for 80 percent of the shortfall: Zhdanov, Stakhanov, and Kremenchug. Each was responsible for introducing new product lines: Zhdanov for eight-axle tank cars, Stakhanov for eight-axle freight cars and specialized fertilizer cars, and Kremenchug for new specialized grain hoppers. Zhdanov alone accounted for almost half the shortfall—some 1,500 cars. [redacted]

The new cars, particularly the eight-axle cars, probably presented technical problems that may not have been resolved on schedule. Investment in plant renovations may not have been implemented. In addition, all three plants also produce vehicles for the military, suggesting that the freight car facilities could be

[3] In 1973 the Ministry of Heavy and Transport Machine Building also transferred the authority for building 40,000 large containers a year by 1976 from the Gorkovets Materials Handling Plant to Abakan. [redacted]

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Table 2
Thousands

USSR: Freight Car Production [a]

Period	Early 1970s Plans	Revised Plans [b]	Actual [c]
1965			39.6
1970			58.3
Ninth Five-Year Plan	425 [d e]		346.7
1971			63.7
1972	72 [d]		68.9
1973		73 [d e]	71.8
1974			72.4
1975	95 [d e]		69.9
10th Five-Year Plan		386 [f]	339.0
1976			71.9
1977			71.2
1978	140 to 150 [d e]		68.3
1979			64.6
1980			63.0
11th Five-Year Plan		390 [g]	
1981			61.0
1982			58.6
1983			58.4 [h]
1984			58.7 [i]

[a] Unless otherwise noted, data published by the Soviets represent a direct count of cars, not a conversion to an equivalent, such as four-axle cars.
[b] Formal plan figures for the years listed. Some additional plan revisions usually occur within individual years or within five-year plan periods.
[c] Data are from *Narkhoz* unless otherwise noted.
[d] Derived from *Soviet Transportation*, No. 554, JPRS 59407, 29 June 1973, pp. 22-27, as follows. *Data for the Ninth Five-Year Plan, 1973, 1975*—reported. *Data for 1972*—rounded; derived from reported output for 1972 and the claim that enterprises under the Ministry of Heavy and Transport Machine Building were short 3,200 cars in their deliveries to the railroads. *Data for 1978*—derived from planned production data for 1973 and from the claim that "in five years it is planned to double the capacity for production of freight cars."
[e] Probably includes larger cars converted to the equivalent in four-axle cars.
[f] *Zheleznodorozhnyy transport*, No. 12, (December 1976), pp. 3-5.
[g] *Sotsialisticheskaya industriya*, 2 August 1981, p. 2.
[h] *Izvestiya*, 29 January 1984, p. 2.
[i] Projected from reported data for January-August 1984. Freight car production statistics have been subsequently withheld from monthly statistical reports.

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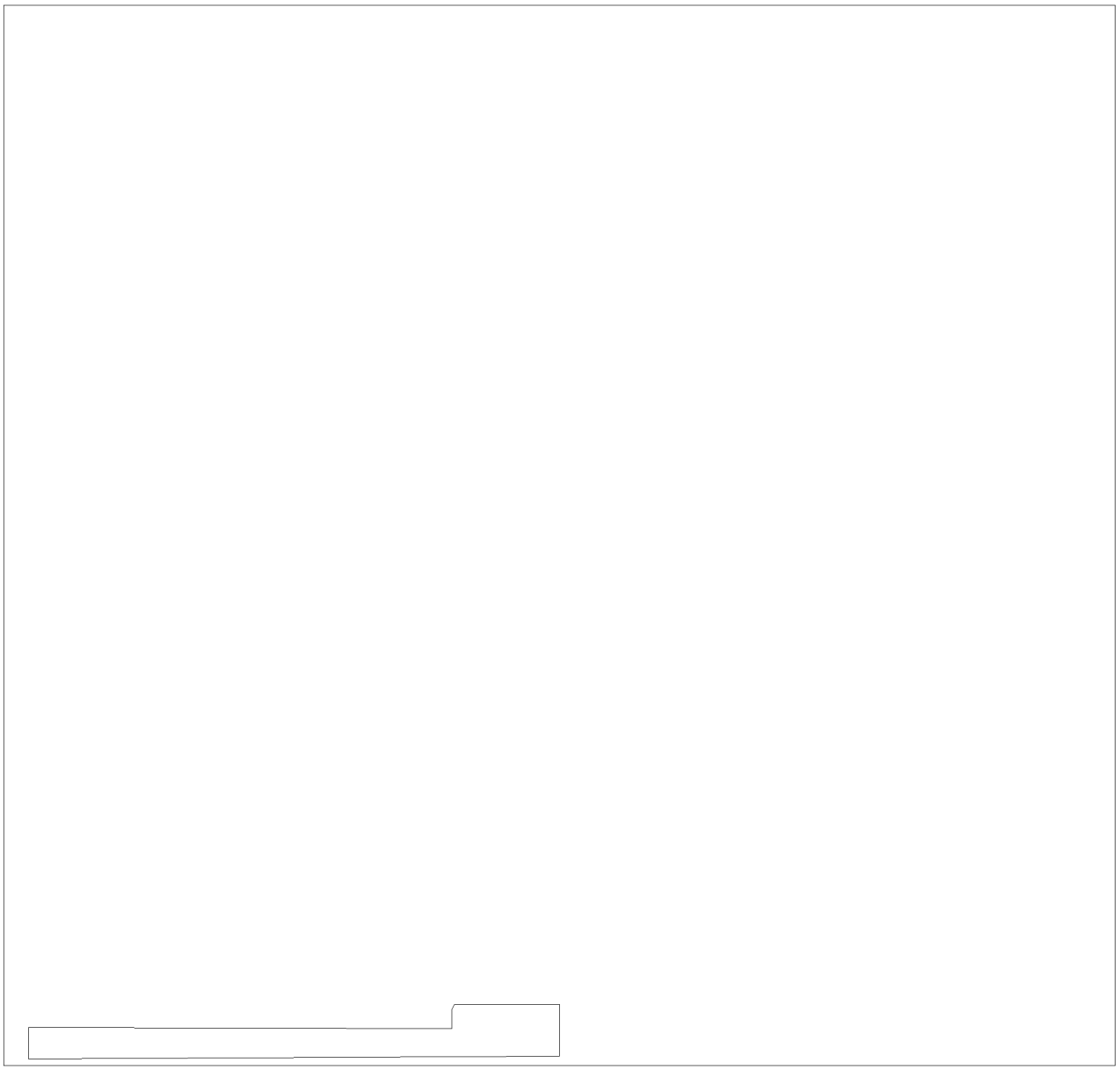

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devoted to military production. However, the estimated production for all armored vehicles was essentially level.

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Longer range plans for freight car production were also placed in jeopardy during the early 1970s. Construction of capacity intended for introduction later in the decade was almost halted. The most serious slippage of the timetable occurred at Abakan in West Siberia, a so-called "shock" or priority project. Construction came to a near standstill in the 1972-73 period, and the plant is still incomplete Abakan may have fallen prey not only to a reassessment of overall investment priorities but also to a reappraisal of projects in Siberia. Expansion of the Altay plant, due for completion in 1976, also was delayed. Construction probably was to begin sometime in 1971-75, but the Soviets reported that even by 1982 less than 20 percent of the funds allocated for its construction had been used.

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Table 3
USSR: Trends in Freight Car Production by Republic [a]

Thousands

	Total	RSFSR			Ukraine
		Total	Abakan [b]	Other	
1975	69.9	32.6	0.0	32.6	37.3
1976	71.9	33.2	0.3	32.9	38.6
1977	71.2	33.3	1.0	32.3	37.9
1978	68.3	31.9	1.6	30.3	36.4
1979	64.6	30.9	1.1	29.8	33.7
1980	63.0	31.4	1.1	30.3	31.6
1981	61.0	30.4	1.1	29.3	30.7
1982	58.6	29.2	1.1	28.1	29.3
1983	58.4	27.8	1.1	26.7	30.6 [c]
1984	58.7	25.5 [d]	1.1	24.4	33.2 [d]

[a] Derived from data in national and republic *Narkhoz*, except where noted.
[b] See appendix.
[c] *Summary of World Broadcasts*, 23 March 1984, p. A16.
[d] Projection made on the basis of reported production from January to June 1984.

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Production Takes a Nosedive

Freight car production leveled off between 1972 and 1977 and then began a marked decline in 1978. Between 1977 and 1983, freight car production fell by 12,800 cars, or by nearly 20 percent.[4] The patterns of decline in the two republics where freight cars are produced, the Ukraine and the RSFSR, are different (see table 3), and we believe the reasons for that are equally different.

Cutbacks at Ukrainian plants caused most of the decline in freight car production. We believe that the decision to scale down production was followed by the decision to accelerate the preparation of facilities for production of new product lines. by 1979, plant expansion was under way at Dneprodzerzhinsk, Stakhanov, and Kremenchug. Some retooling at Kremenchug was also shown. Indeed, this renewed drive for modernization was beginning to show some results by 1983, when freight car production in the Ukraine increased by about 4 percent. In the first half of 1984, output was up another 10 percent. The Soviets claim– 25X1
that eight-axle gondolas at Stakhanov and 70-ton specialized grain cars from Kremenchug have now entered production. 25X1

Falling output in the RSFSR can be linked partly to modernization but also to a change in plans for Nizhniy Tagil, the Soviets' major producer of gondolas. Although output in the RSFSR did not decline as much as it did in the Ukraine through 1980, the drop is significant. Freight car production statistics for the RSFSR, exclusive of output from Abakan, show a sudden fall in output of 2,000 cars in 1978. The magnitude of this drop must be linked to the Nizhniy Tagil plant—which, we thought, had produced 20,000 cars a year—and the Altay plant—which, according to Soviet claims, had produced 11,000 in 1976. Output at other RSFSR plants is not large enough to

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[4] The decline does not reflect a change in mix from four-axle to higher capacity six-axle and eight-axle cars. Soviet statistics for freight car production measured in four-axle equivalents show the same pattern of decline (*Vestnik statistiki*, No. 8, 1984, p. 72).

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explain the 1978 decline—unless they had all closed down their railcar production lines simultaneously. Nizhniy Tagil reportedly dropped its prototype line of eight-axle gondolas in early 1978, which may help explain the initial decline. The Altay plant has long endured raw material shortages; however, these did not appear to become more intense during 1978.

Output declines in the RSFSR have continued and, since 1983, have become more pronounced. We cannot confidently state the causes for the declines since 1980. Nationwide shortages of raw materials and construction work at the Altay plant could have lowered production. By 1983, however, raw material shortages had diminished, and by 1984 construction at the Altay plant was largely complete. Nevertheless, the slide in freight car output has become more pronounced; output fell by 4.8 percent in 1983 and by 8.3 percent in the first half of 1984. We suspect that production again has declined at Nizhniy Tagil. Because Nizhniy Tagil is also the largest producer of medium tanks and because the Soviets abruptly cut off national and republic reporting of freight car output last summer, it may be that the Soviets increased tank-related output at the expense of freight car production at Nizhniy Tagil. However, our current estimates of tank production at Nizhniy Tagil are 30 to 35 percent lower than estimates for the early 1980s. It is unlikely that we will find overt defense reasons for a decline in freight car output there

Production Outlook

Recent patterns of production suggest that the modernization program—at least as far as Ukrainian plants are concerned—is finally beginning to pay off. Indeed, according to the original plans, annual output in the Ukraine could increase by 10,000 to 15,000 cars through the 1980s. Many will be special-purpose cars, particularly for grain and agricultural chemicals. These plants also will supply new eight-axle gondolas, large flatcars, and other open cars. National output will not approach the original targets for the balance of the 1980s, however, because of changes in goals for plants in the RSFSR. Huge increases planned for Abakan's output of container-carrying flatcars have been delayed. Also, the Soviets may be reducing the role of the Nizhniy Tagil facility—formerly the main producer of freight cars.[5] On the other hand, output of all-metal boxcars at Altay and refrigerator cars at Bryansk is still scheduled to increase. On balance, production of freight cars in the RSFSR probably will see little growth through the 1980s and—depending upon the plans for Nizhniy Tagil—could continue to decline.

Inventory Growth Decelerates

Since 1975, growth of the freight car inventory has declined, falling from an average annual rate of 5.7 percent during the 1971-75 period to 3.7 percent during 1976-80 and to 2.8 percent in 1981-83 (see table 4). The decline was caused partly by the drop in freight car production, but also by tripling of retirements and a decline in imports.

Retirements

Historically, the Soviets have retired freight cars after 40 years of service. Under this formula, retirements would have quadrupled between the early and late 1970s (see footnote c, table 4). Moreover, Moscow had hoped to increase retirements still more by moving to a 30-year schedule in 1975. We believe that the Soviets shelved this policy when freight car production fell, and they may have further extended the service life of existing freight cars. In December 1980, writers in *Gudok,* the Soviet railroad newspaper, alluded to this extension as they lobbied for accelerated completion of new freight car production capacity, stating that "a good many railroad cars on the country's mainlines are slated for scrapping. But they

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Table 4
USSR: Estimates of the Freight Car Inventory

Thousands

	Yearend Inventory [a]	Domestic Production	Net Imports	Retirements [b]
1970	1,130	58.3	6.2	6.0
Ninth Five-Year Plan				
1971	1,194	63.7	5.8	5.2
1972	1,266	68.9	7.5	4.5
1973	1,343	71.8	8.7	3.8
1974	1,420	72.4	9.6	4.3
1975	1,489	69.9	9.3	11.0
10th Five-Year Plan				
1976	1,551	71.9	5.5	15.0 [c]
1977	1,613	71.2	5.8	15.0 [c]
1978	1,672	68.3	5.8	15.0 [c]
1979	1,729	64.6	7.0	15.0 [c]
1980	1,785	63.0	7.6	15.0 [c]
11th Five-Year Plan				
1981	1,838	61.0	6.7	15.0 [c]
1982	1,887	58.6	5.9	15.0 [c]
1983	1,937	58.4	6.7	15.0 [c]

[a] Derived as the sum of domestic production and net imports, minus retirements, and rounded to the nearest thousand.

[b] The Soviets assume a 40-year service life for freight cars. Except where noted, the series assumes that each freight car is used for 40 years and then is retired.

[c] The Soviets planned to reduce the service life for freight cars from 40 to 30 years in 1975. We believe this policy was not implemented, and that they continue to use a 40-year service life. Indeed, they even may have further extended the retirement rate. For present purposes we have assumed a 40-year schedule with some adjustments. An unusual retirement schedule may have resulted for 1976 through 1983 because of anomalies in the pattern of Soviet freight car production before and during World War II. The 40-year retirement schedule in thousand units is: 1976—27.3; 1977—28.3; 1978—22.3; 1979—18.6; 1980—23.3; 1981—0; 1982—0; 1983—0. The estimated retirement series shown is an attempt to smooth the surges and slumps by allocating the total retirements for the eight years among all years—an average of 15,000 a year.

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remain in operation." The retirement schedule we have assumed is a modified version of the 40-year schedule which allows lower retirements in the late 1970s. As the production volume of new freight cars increases, we expect that the Soviets will again try to accelerate retirements.

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Trade

In the 1970s, Moscow did not increase imports of freight cars to counter sliding domestic production. Opportunities for increasing imports over the short run were constrained by limited production capacity in Eastern Europe, the USSR's major source of imported freight cars (see table 5).

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Furthermore, events in Poland in 1981 depressed heavy industry, and deliveries of freight cars to the USSR declined sharply from 1981 through 1983.

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Table 5 *Thousands*
USSR: Estimated Imports of Freight Cars [a] [b]

	Total Imports	Poland	East Germany	Romania
1970	6.2	5.2	1.0	0.0
1971	5.9	5.0	0.9	0.0
1972	7.6	5.2	0.9	1.5
1973	8.7	4.4	1.2	3.1
1974	9.6	4.4	1.3	3.9
1975	9.4	4.5	1.0	3.9
1976	5.8	4.8	1.0	0.0
1977	5.9	4.9	1.0	0.0
1978	6.1	5.1	1.0	0.0
1979	7.4	4.8	1.1	1.5
1980	8.3	4.7	1.1	2.5
1981	7.3	2.6	1.2	3.5
1982	6.5	1.8	1.2	3.5
1983	7.3	2.5	1.3	3.5

[a] The USSR's imports of freight cars from countries other than those listed are negligible.
[b] Data for 1970-75 are from the yearbook of Soviet trade statistics, *Vneshnyaya torgovlya*. Data for 1976-83 are *estimated* from trade statistics of individual partner countries or reported planned imports.

The Soviets may soon find relief from these depressed import levels. Increased imports from Poland, together with sustained imports of 3,000 to 4,000 specialized grain cars per year from Romania, should boost imports back to the levels of the mid-1970s. Moscow has signed a 10-year contract for joint manufacture of special-purpose cars with Finland. This agreement could provide an additional 3,000 to 4,000 freight cars per year as early as 1986.

Changing Composition of the Freight Car Inventory

Even though little progress has been made to date in adding larger cars to the inventory, some has been made in diversifying the freight car fleet. Table 6 shows the effects of trends in production, imports, and retirements—notably that specialized cars have taken some of the share once held by general purpose cars. The share of gondolas—the Soviets' most important general cargo carrier—declined from 42 percent of the fleet in 1970 to 34 percent in 1979. The share of boxcars, also major general cargo carriers, declined by 2 percentage points during this period. In contrast, the inventory of freight cars in the "other" category grew rapidly; its share rose from 3 percent in 1970 to over 11 percent in 1979.[6] 25X1

These trends reflect the priority Moscow has given to diversifying the fleet, the effects of delayed plans for producing new gondolas and boxcars, and, perhaps, the production cutbacks at the Nizhniy Tagil plant. These trends also suggest that the proportion of specialty cars—particularly those for moving agricultural freight—has been increasing since 1979 and will continue to do so in the future. The quality of the boxcar fleet will be improved as new models from Altay are absorbed. Major changes in the gondola fleet await larger scale production of new six-axle and eight-axle models. 25X1

Outlook for the Inventory

The new freight cars being fielded in increasing numbers will help to improve the quality and composition of the fleet. The trend toward a more diversified inventory—cars adapted to particular uses such as agricultural shipments—appears certain to continue 25X1
as indicated by the modernization program in the Ukraine, as well as by a probable expansion of imports from Eastern Europe and Finland. The quality of the general purpose fleet of boxcars and gondolas will also probably be improved. All-metal boxcars will be more durable than their predecessors, and the new eight-axle gondolas will allow nearly a two-for-one cargo advantage over the four-axle models that now dominate the stock. Nevertheless, replacement of a substantial part of the huge stock of these general purpose cars will take years, although increased retirement rates to rid the fleet of less reliable older cars would, of course, speed up the process. 25X1 25X1

[6] This category includes mainly specialized cars such as cement cars, agricultural and livestock cars, and probably some special-purpose gondolas. 25X1

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Delayed Modernization—The Effects on Railroad Performance

Growth of the freight car fleet—although sharply reduced in the late 1970s and early 1980s—should have been adequate to meet the slower growth in demand for rail services that resulted from the industrial slowdown.[7] For example, growth of the fleet outpaced growth of rail freight turnover, which was held down by the plummeting rates of growth in the production of its main customers in the industrial materials industries (see table 7 and figure 4). Nevertheless, a slump in key performance indicators undermined the fleet's otherwise adequate growth and spawned an outbreak of damaging shortages. Meanwhile, the slow but steady advance of congestion on existing mainlines also took its toll on railway performance.

Rising Turnaround Times Lead to Freight Car Shortages

Between 1975 and 1980, freight car turnaround time—the duration of an average freight car trip—rose by 15 percent (see table 8), reducing the supply of cars available (see inset). The rise in turnaround time more than offset the 12.6-percent increase in the *working fleet* (see inset) of freight cars during the same period, consequently leaving the railroads—in the face of a 17-percent boost in industrial output—worse off than they were in 1975. Again, the result was a chronic shortage of freight cars. Thus, Soviet managers and state planners often blamed an inadequate supply of freight cars for their failure to meet output targets and contract deliveries.

Rising turnaround times may be attributed to the increasing distance between producers and consumers and to declining train speeds. The average distance traveled by a freight car increased by about 5 percent between 1975 and 1980, and average train speeds slowed during the period by 8 percent because of increasing congestion, more frequent accidents, and inefficient car handling. However, only 22 percent of a car's time is spent in motion. Consequently, much of the increase in turnaround time resulted from longer loading and unloading operations—which account for about one-third of the duration of a freight car trip—or at classification yards and interchanges—which account for the remaining 44 percent.

In his November 1979 plenum speech, Brezhnev took the railroads to task for their poor performance. He identified loading and unloading operations as a cause

The Freight Car Inventory—Some Basic Concepts

The freight car inventory *is a count of all freight cars for use in mainline service.* 25X1

The working fleet *is a measure of the average number of cars in the inventory that are actually in service during a year. A railroad's working fleet must be at least as large as the product of (1) the number of cars required to load total shipments on an average day and (2) the average time required to accomplish a freight car trip, the so-called* turnaround time. *For example, if shipment volume for an average day requires 100,000 freight cars and a freight car trip averages six days, then the working fleet must total at least 600,000 freight cars.* 25X1 25X1

The effective supply *of cars is the part of the working fleet available on any given day, that is, the working fleet divided by turnaround time. A 1-percent increase in turnaround time with no change in the size of the working fleet will result in a 1-percent decline in the effective supply of cars. With no change in the average carrying capacity of a freight car, this also will result in a 1-percent decline in shipment volume.* 25X1

The availability rate *of the inventory is the ratio of the working fleet size to the size of the inventory. As a measure of the proportionate gap between freight cars in service and all cars, this statistic helps to analyze trends in requirements for freight car repairs.* 25X1 25X1

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Table 6
USSR: Changing Composition of the Freight Car Fleet [a]

	Share of Total Inventory [b] *(percent)*		Total Inventory [c] *(thousand cars)*		Average Annual Rate of Net Increase, 1971-79 *(percent)*
	1970	1979	1970	1979	
Total fleet	**100.0**	**100.0**	**1,130**	**1,729**	**4.8**
Boxcars	24.7	22.5	279	389	3.8
Gondolas	42.5	34.4	480	595	2.4
Flatcars	12.1	14.8	137	256	7.2
Tank cars	14.9	15.0	168	259	4.9
Refrigerator cars	2.8	2.2	32	38	1.9
Other [d]	3.0	11.1	34	192	21.2

[a] Some qualitative improvements may have been made to the inventory of individual car models between 1970 and 1979. Nevertheless, we believe that a typical boxcar, for example in the 1970 fleet, is essentially the same as a typical boxcar in the 1979 fleet.
[b] Andrei Deribas, et al., *Organizatsiia grozovoi i kommerchiskoi raboty zheleznodovozhniy transporta* (1980),
[c] Derived from the share of the total inventory in 1970 and 1979 and the inventory estimates presented in table 4.
[d] This category includes mainly specialized cars such as cement cars, agricultural and livestock cars, and probably some special-purpose gondolas.

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Table 7
USSR: Trends in Economic Activity and Growth of Transportation [a]

Average annual growth in percent

	1971-75	1976-80	1981	1982	1983	1984
GNP	3.7	2.6	1.9	2.6	3.7	2.5
Industrial production	5.9	3.2	2.3	2.4	3.8	3.8
Machinery	7.8	5.0	3.1	4.0	5.0	5.5
Materials	5.3	2.1	1.7	1.3	3.2	2.7
Nonenergy [b]	5.1	1.3	1.6	0.7	3.6	2.7
Total freight turnover [c]	6.7	4.3	3.5	1.2	5.1	2.7
Pipeline	18.0	13.9	7.2	6.9	6.6	6.8
Rail	5.3	1.2	1.8	−1.1	4.0	1.1
Freight car inventory						
Total	5.7	3.7	3.0	2.7	2.6	NA
Working fleet [d]	4.6	2.4	−1.2	−0.5	NA	NA

[a] The data for GNP and industrial production (and its components) are derived from CIA estimates measured according to Western accounting practices at factor cost. The turnover data are derived from the data in table 1. Comparison of trends between value-weighted series (industrial production) and series measured in physical units (turnover) should be viewed with caution. For example, composition change in the industrial production index toward products with either a higher value per ton or a comparatively lower need for transport services would cause the industrial production and transport turnover indexes to diverge. Indeed, the more rapid growth of the machinery versus industrial materials components has contributed in the past to the poor correspondence between trends in industrial production and transport turnover. However, this phenomenon is less important for the nonenergy industrial materials, whose output trends parallel the turnover trends for its main carrier—rail transport.
[b] Nonenergy industrial materials include: ferrous metals; nonferrous metals; chemicals and petrochemicals; wood, pulp, and paper; and construction materials.
[c] Measured in ton-kilometers.
[d] A measure of the average number of cars in service during each year. See inset in text.

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Figure 4
USSR: Rail Tons Originated in 1965 and 1980

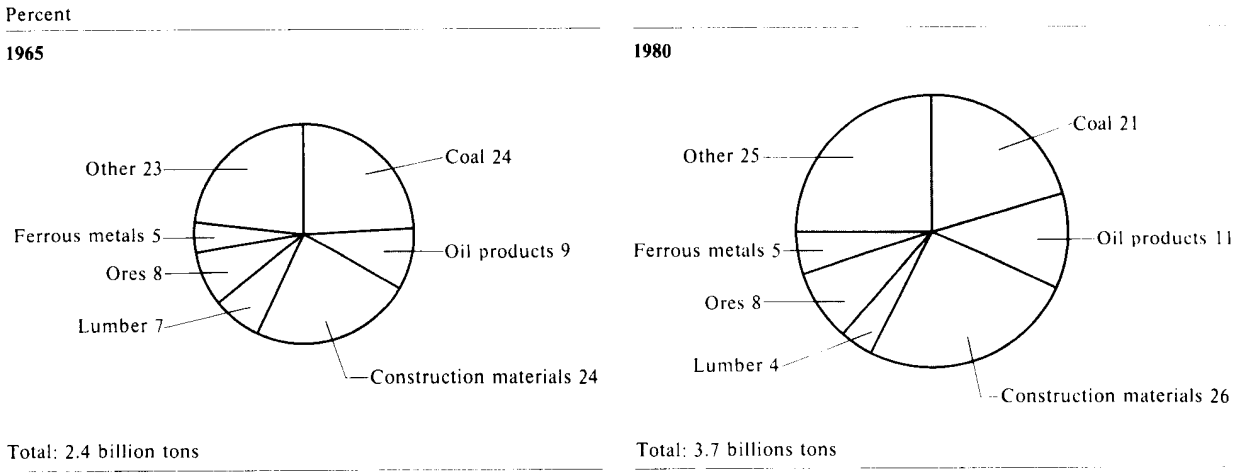

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Table 8
USSR: Main Indicators of Rail Performance

	Average Distance Traveled (*kilometers*)			Average Train Speeds [a] (*km per hour*)	Breakdown of an Average Freight Car Trip (*hours*)			
	Total Trip	Loaded Trip	Empty Trip		Total Trip [b]	Loading-Unloading [c]	In Motion	Other
1965	1,305	930	375	33.6	125.5	44.2	28.7	52.6
1970	1,423	1,015	408	33.5	133.7	44.7	30.6	58.4
1975	1,451	1,035	416	33.4	140.2	47.9	31.1	61.2
1980	1,532	1,093	439	30.6	162.0	NA	NA	NA
1981	1,539	1,100	439	30.9	159.1	NA	NA	NA
1982	1,537	1,099	438	30.6	160.6	NA	NA	NA
1983	NA	NA	NA	31	153.2	NA	NA	NA
1984	NA	NA	NA	NA	145.5	NA	NA	NA

[a] The measure selected is "average section speed," which includes scheduled stops. This is a better measure of the overall performance of the system than "technical speed," which excludes scheduled stops and approximates average distance traveled divided by time in motion for freight cars.
[b] The total amount of time is a measure of "turnaround time" (see text).
[c] Although the Soviets no longer report statistics for loading and unloading, they occasionally provide statements about its contribution to changes in overall turnaround time. For example, the Soviets claim that 90 percent of the decline in turnaround time in 1983 was caused by reductions in loading and unloading time.

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of performance problems and ordered that the time spent on these be reduced. Under increasing pressure from Moscow, the railroad managers halted the rising trend in turnaround time by 1981. They did this by undertaking measures to halt the decline in train speeds and to hold down car loading and unloading times. Despite these successes, other underlying problems became more pronounced, and freight car shortages persisted.

Rising Freight Car Damage Causes Further Problems

Measures to speed up freight service—both on the mainlines and in loading and unloading operations—caused an increase in freight car damage. However, Moscow failed to institute a parallel program for repairs—a need Brezhnev had pointed out in his 1979 speech. The result was an estimated decline in the working fleet in 1981 and 1982. Therefore, even though turnaround times were better controlled, the number of freight cars available for loading continued to diminish, and freight car shortages persisted.

Adding to the pressure on repair facilities was the large share of older cars remaining in service. Older cars are particularly subject to higher repair rates that reduce their availability. Indeed, in 1981 the average availability rates—the ratio of the working fleet to the total inventory—were lowest for boxcars and flatcars, whose inventories contained a larger number of cars approaching retirement (see table 9).

Growing Congestion—A Continuing Concern

Throughout the period, Soviet railways fought the slow but steady advance of congestion on the mainlines. Rail line densities appeared to peak in the late 1970s, making it even more difficult to move additional tons of freight. Congestion led to reduced train speeds and increased difficulties in adjusting to external shocks, such as the unusually severe winters of 1979 and 1982 and fluctuations in requirements for movement of agricultural commodities. In 1980, the Soviets raised the state standard for load per axle from 22 to 23.25 tons to promote the use of heavier trains as a way to at least not increase congestion. This change may have helped stabilize performance in the early 1980s. Nevertheless, the new standard either was not sufficiently adhered to or was not set high enough because the Soviets repeatedly were forced to impose selected embargoes on rail transport, causing repercussions throughout the Soviet economy. Low-priority lumber shipments, for example, repeatedly were forced off the mainlines, causing shortfalls in inputs to customers in the building materials and light industries.

Table 9
USSR: Availability of the Freight Car Fleet, 1981

	Total [a] Fleet (*thousands*)	Working [b] Fleet (*thousands*)	Availability [c] (*percent*)
Total [d]	**1,838**	**1,275**	**69**
Boxcars	415	255	61
Flatcars	291	188	65
Tank cars	283	204	72
Gondolas	599	460	77
Other cars	250	167	67

[a] Estimates are derived from extrapolating the trends in the share of the total fleet from table 6 and applying them to the estimate of total inventory in table 4.

[c] Ratio of the working fleet to the total fleet.
[d] Components may not add to totals due to rounding.

Stopgap Measures To Stabilize Rail Performance

The problems of congestion and declining freight car productivity—caused by incomplete implementation of stopgap measures—combined to reach crisis proportions in 1982 when bad winter weather threw rail schedules into disarray (see inset, page 16). Attempts to manage the recovery of the railroads during 1982 finally fell far short of need. Both shipments and traffic on the mainlines fell below their 1981 levels, as freight car shortages and mainline congestion became more pronounced.

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Andropov, reacting to the crisis in rail transportation during 1982, demonstrated his determination to improve railroad performance quickly by lambasting the railroads in his first plenum speech in November 1982. Within a week, he underscored his determination by replacing the Minister of Railways, Ivan Pavlovskiy.

Andropov's criticism spurred the rapid implementation of measures intended to attack the sources of freight car shortages and rail congestion. By December 1982, the basic performance indicator for the railroads was changed from freight turnover (ton-kilometers) to the dual indicators of shipments (tons originated) and turnaround time. An initiative also was approved by the CPSU Central Committee to greatly increase the capacity for freight car repair by authorizing shops in industrial enterprises to repair freight cars for the rail ministry. In addition, Konarev urged the use of heavier trains, which, according to the Soviet literature, led to authorization for loading cars beyond even the new state weight norm per axle. Finally, a wage reform for rail transportation was introduced to spur labor productivity.[9]

The recovery in rail performance during 1983 and most of 1984 attests to the short-run effectiveness of these measures. Rail freight turnover grew by 4 percent in 1983, the highest annual rate since 1975. Mild weather spurred the pace of this recovery, but we believe that congestion and freight car shortages—if allowed to progress—would have dampened it sharply. Turnaround time also improved—falling by 4.6 percent, the first major decline since the 1960s. In addition, the quantity and quality of freight car repair reportedly rose, although Soviet publications indicate that incidents of damage rose as well. Availability of freight cars increased as the decline in turnaround time boosted the annual carrying capacity of the working fleet. The incidence of congestion—for example, rail line embargoes—also declined even though freight densities—ton-kilometers of freight per kilometer of rail line—rose substantially for the first time in years. Even though effective in 1983 and most of 1984, these measures are not long-term solutions to the basic problems of the rail system.

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The Soviets claim that 90 percent of the *reduction in turnaround time* in 1983 resulted from reducing demurrage—the time in loading and unloading a freight car. However, these reductions probably resulted from expansion of the workweek—overtime for weekend and holiday work—rather than from increased labor productivity. Bolstered by statements in Soviet publications "recommending" additional weekend and holiday work, overtime leaped by 9.5 percent in 1983. If expansion of the workweek has been the source of improved turnaround time, then further gains may be difficult to achieve.

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The *freight car repair initiative* expanded the repair base by increasing the participation of the railroads' industrial customers. Although many enterprises had already set up shops to repair damaged incoming cars to ensure that their own requirements were met, they were being encouraged to repair cars for the use of others. But enterprises probably are unwilling to commit additional labor, equipment, materials, and space for repairs for others. Unless incentives change, repairs will remain secondary to production. Even if the repair campaign intensifies, enterprises probably will follow the practice of the rail ministry's own central repair shops, which give priority to trivial repairs and delay those that are more costly. Increasing repairs at industrial enterprises, which lack not only incentives but also specialized equipment and skilled workers, is also likely to reduce their quality. Without a sizable expansion in the number of new, dedicated repair plants—one valued at $50 million to be built and operated jointly with Finland is nearing completion near Leningrad—the freight car repair initiative is only a stopgap measure.

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[9] A December 1982 resolution of the CPSU Central Committee and the USSR Council of Ministers approved two new wage incentives for transportation workers. First, enterprises could use wage fund savings to supplement employees' base salaries. Total supplements, however, were constrained both by the size of the wage fund savings and a limit of 1 percent of the wage fund. Second, the State Committee for Labor was empowered to raise pay rates up to 20 percent in the transport ministries for "decisive jobs," and the maximum bonus for workers could be increased "when necessary." Although the Soviets have not defined "decisive jobs," this reform is potentially more powerful than the first because it expands the wage fund.

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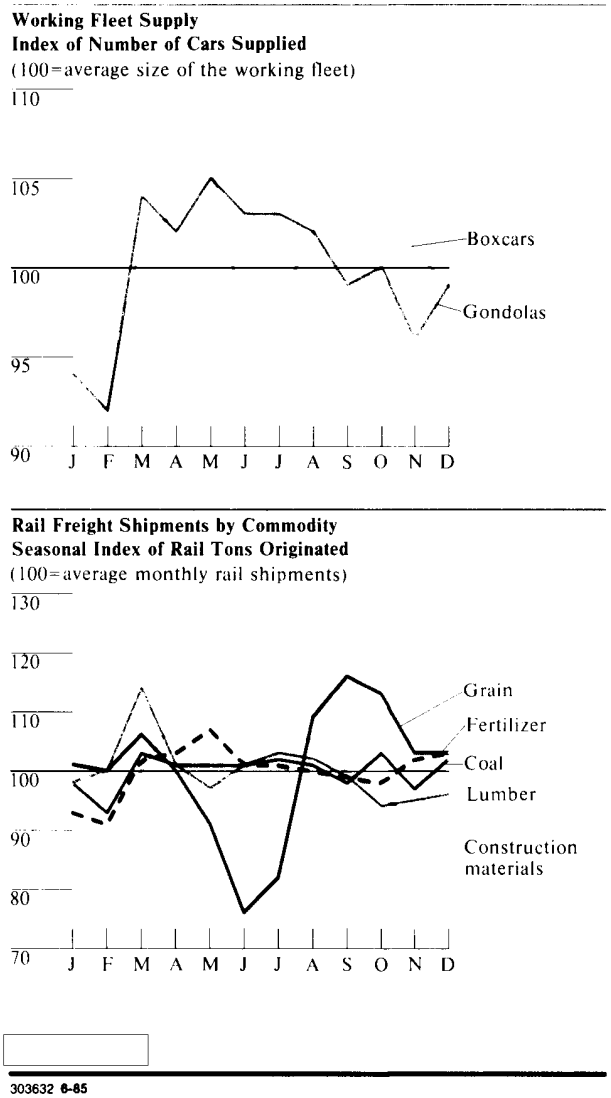
Figure 5
USSR: Seasonal Demand for Boxcars and Gondolas, 1981



Bad Winters Disrupt Rail Transport—The Case of 1982

After a bad winter in 1982, the task of moving delayed winter shipments and rebuilding stocks conflicted with the normally heavy spring demand for freight cars to transport industrial materials. Production of industrial materials consequently backed up and disrupted the flow of goods both for shipping and receiving industries. The onset of the harvest in 1982, which competes with industry for covered railcars such as boxcars (see table 10), probably sharply curbed shipping opportunities for producers of industrial materials even before these backlogs could be cleared. 25X1

The railroads had only a limited ability to provide substitutes for boxcars required by the agricultural sector, and Moscow probably apportioned those remaining among materials producers on a priority basis. In addition, the Soviets probably assigned more of the gondola fleet to materials shipments. To do so, Moscow must have reallocated gondolas among all producers, a difficult scheduling problem given the interrelated priorities of coal, building materials, and metals and ores. 25X1

This juggling was made more difficult because the Soviet economy demands almost continuous operation of both boxcar and gondola fleets throughout the year (see figure 5). With the exception of January and February—when the economy relaxes somewhat from the characteristic end-of-year "storming" (to meet the annual output targets) and when harsh winters limit activity on some rail lines—the number of boxcars and gondolas in the working fleets varies only a few percentage points from average. 25X1

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Konarev's strategy for pushing *the use of heavier trains* on the rail system is another stopgap measure that may backfire. Instead of waiting for the gradual introduction of higher capacity cars, the Soviets are trying to overload lower capacity cars. These writers acknowledge that the new state standard of 23.25 tons per axle on freight cars was attainable—given ongoing upgrades to the fleet of cars. However, the management of the Ministry of Railways by early 1983 was permitting dispatchers to overload cars to 24 tons per axle—too heavy for "a number of components of cars being produced." The result, these sources suggest, will be a higher incidence of premature car breakdowns. 25X1

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Outlook

The Soviet railroads should be able to make headway on the chronic problems of congestion and freight car shortage during the 12th Five-Year Plan period

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Table 10
USSR: Estimated Freight Car Use by Commodity, 1981 [a]

Thousands

	Gondolas	Boxcars	Flatcars	Tank Cars	Other Cars
Total	**460**	**255**	**188**	**204**	**167**
Industrial materials					
Energy					
Coal and coke	179	0	0	0	1
Petroleum	0	0	0	193	0
Building materials					
Mineral	74	96	25	0	37
Lumber	69	16	12	0	0
Metals and ores					
Ferrous metals	67	1	10	0	0
Ores	57	1	0	0	19
Selected agricultural products					
Grain and flour	0	51	0	0	15
Fertilizer	7	31	0	3	9
Other freight	7	59	141	8	86

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(1986-90). Demand for rail service should grow slowly, and the Soviets appear ready to make steady improvements in the structure and carrying capacity of the freight car fleet.

Because of the dominance of industrial materials in mainline traffic and the close correspondence between growth of rail turnover and industrial materials output in the past, annual growth of rail turnover probably will follow the trend in industrial materials output. Output of nonpetroleum industrial materials is unlikely to grow much beyond 2 percent a year through 1990.[10] The railroads are no longer important carriers of crude oil and their continued dominance in petroleum product shipments is likely to wane. The Soviets plan to build more product pipelines. Moscow hopes that increased investment in the agro-industrial complex will begin to pay, and planners probably will be highlighting measures to improve rail service to agriculture. The slow growth in the output of industrial materials will limit growth in the economy's requirements for freight cars, although continued emphasis on the Food Program will spur growth for special-purpose cars, such as grain hoppers, refrigerator cars, and livestock and fertilizer carriers.

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In the past two years, the Soviets have further reduced the requirements for growth of the freight car fleet by reducing the fleet's turnaround time. Expansion of the workweek probably has been a major source of past improvements, but future gains must come from attacking inefficiencies and delays caused by rail customers in the industrial ministries—a much broader and more difficult problem to address.

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Initiatives to increase freight car repairs will require continuous monitoring by high officials. The construction of new, modern repair facilities will take time. Until they are ready, the burden of increased repairs will fall on industrial enterprises, which will be lobbying to reduce their role.

If the Soviets could maintain freight car productivity at current levels, then the required growth of the working fleet would be limited to that of demand—roughly two percent per year. However, simple expansion of the working fleet will aggravate congestion on the mainlines and reduce freight car productivity. The Soviets instead need to selectively expand the fleet with the goal of raising the amount of cargo hauled per train. Indeed, to reduce mainline congestion they may even choose to increase production of new car models faster than the growth in demand implies. They appear determined to increase the proportion of specialty cars in the fleet. These cars will help to reduce losses—of particular importance to agriculture—and will help boost train weights because the cars will be better matched to their cargoes. Since many new models of freight cars are equipped with more efficient unloading mechanisms, they will also help to speed up freight service. Even though growth in demand by industrial materials producers is likely to be slow, Moscow ultimately needs to replace the fleet of general purpose cars that serves them. Retirement of increasing numbers of aging lower capacity boxcars and gondolas will require increased production of higher capacity and more reliable replacements.

Moscow especially needs to overcome the boxcar and gondola shortages that are caused by both increasing downtimes for repair of old cars and delayed introduction of new models. Output of older models probably could have increased easily if priority had been given to allocation of resources to rail car plants. But the Soviets seemed to avoid expanding production of the older four-axle models because, short of strong remedial action for improving turnaround time and other efficiency measures, additional cars would have further congested the mainlines. The full-scale production of new, higher capacity cars is clearly Moscow's answer to the problem. However, as resources throughout the economy are still tight, Moscow may have to be selective in deliveries to the most congested areas, if priorities for investment and raw material resources elsewhere in the economy take precedence over full-scale production of the new large-capacity cars. 25X1

The Soviets appear prepared now—unlike during the 10th and most of the 11th Five-Year Plan periods (1976-85)—to implement these improvements to the freight car fleet. The plan for modernizing the freight car fleet—although 10 years late—is beginning to bear fruit. Production at plants in the Ukraine has already increased with emphasis being placed on cars that support agriculture—grain hoppers from Kremenchug and fertilizer cars from Stakhanov—and cars that will help reduce mainline congestion—eight-axle gondolas from Stakhanov. In the RSFSR, expansion of the Altay plant appears to be complete, and increased production of all-metal boxcars is probably planned. We are not sure about plans for Nizhniy Tagil. Its declines in production could mean reduced output over the longer term of older models of gondolas with or without introduction of new model cars. As we indicated earlier, we do not know 25X1
what use 25X1
is intended for a new production building under construction there. 25X1

Moreover, increased imports of freight cars may further boost the domestic supply. Freight-car-producing facilities in Poland are being expanded, and increased production may be intended for export to the USSR. Romania reportedly will continue to supply the USSR with 3,000 to 4,000 special-purpose grain cars per year, and a new joint venture with Finland may begin increasing supplies further by 1986. 25X1 25X1

Even if the Soviets are able to modernize the freight car fleet more rapidly—including accelerated retirement of older models—the railroads will spend much of the next five-year plan period (1986-90) in an awkward transition before a significant part of the inventory is replaced. We foresee better rail performance, both in terms of reduced incidence of freight car shortages and mainline congestion through 1990, but

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the improvement will probably be gradual and accompanied by continuing high-level scrutiny and stopgap measures to limit the growth of problems during the transition. 25X1

Although the incidence of shortages and congestion will probably decline, the situation will remain taut at least until 1990 as the modernization program begins to unfold. Moreover, until there is significant excess capacity—which will take many more years to achieve—the railroads will remain vulnerable, for example, to the effects of severe winter weather or conceivably to extraordinary short-term demands associated with preparations for limited military actions. The severe winter of 1984/85 showed that the railways do not have sufficient reserves to compensate for freight cars isolated by snowbound rail lines and frozen switches and freight. Efforts to improve performance over the last two years will meet their first challenge during the balance of 1985 as the railways try to unravel backlogged shipments. 25X1

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Appendix

Methodology for Determining Railcar Production at Abakan

1975-76 — Derived from Soviet claims that output at Abakan began in February and March 1976 (*Summary of World Broadcasts* [*SWB*], 5 March 1976, p. A9) and reached a rate of 50 cars a month by September (*SWB*, 24 September 1976, p. A17). We assume that monthly production in 1976 increased steadily from 0 during February to 50 in September and that the September rate was maintained during the October-December 1976 period.

1977 — Based on the yearend Soviet claim that Abakan produced 1,000 flatcars a year (*SWB*, 6 January 1978, p. A14).

1978 — Based on the Soviet claim that, by early October 1978, over 2,500 freight cars were manufactured (in total) by Abakan (*SWB*, 20 October 1978, p. A16) and on production estimates for 1976 and 1977. A report in the Czechoslovak press (*Technicky Tydenick*, No. 12, March 1979) confirms that in 1978 Abakan delivered 1,500 flatbed cars to the Soviet railways and that an additional 50 modified cars were tested in Cuba.

1979 — Derived from a claim in the Czechoslovak press (*Technicky Tydenick*, No. 12, March 1979) that in 1979 the USSR planned to export 100 Abakan cars to Cuba and from estimated average annual deliveries from Abakan to the Soviet railroads during 1979, 1980, and 1981.

1980 — Derived from the assumption that exports to Cuba remained at the 1979 level and from estimated average annual deliveries from Abakan to Soviet railroads during 1979, 1980, and 1981.

1981 — Derived from the assumption that exports to Cuba remained at the 1979 level and from the following manner of estimating average annual deliveries from Abakan to Soviet railroads during 1979, 1980, and 1981:

1. In 1981 the Soviets claimed that there were "now" about 5,000 of the Abakan railroad cars in service in the USSR (*Sovetskaya Rossiya*, 1981, p. 150). The specific date referred to is uncertain. The range used corresponds to yearend 1980 and midyear 1981.

2. The number of cars delivered to the Soviet railroads through the end of 1978 equals estimated production—2,850—minus estimated exports to Cuba—50—or 2,800 cars.

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3. The average monthly rate of delivery between the end of 1978 and the yearend 1980 and midyear 1981 is 5,000 cars minus 2,800 cars delivered divided by 24 months or 30 months. Average annual production for domestic use thus ranges from 880 to 1,100 cars. Total production equals domestic deliveries plus exports (100 per year) or 980 to 1,200 cars per year. A rough midpoint of 1,100 cars per year is used.

1982-83 Assumed to be the same as for 1981.

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